

Chemical Screening Test

Scope:

To describe the chemical screening procedures commonly referred to as color test or spots test for preliminary tests of controlled substances and non controlled substances.

Safety:

Chemical color tests may use a variety of corrosive, caustic and other dangerous chemicals. Caution should always be practiced and appropriate personal protective safety equipment should be used.

Refer to MSDS for additional safety information for specific chemicals.

Standards and Controls:

Each color test stock reagent must be labeled with the name of the reagent or solution as well as the date of preparation and preparers' initials. The reagent book will be maintained and will include the preparers' initials and the date prepared as well as the results of the appropriate quality control testing.

It is the responsibility of the analyst to determine if reagents are working properly. Negative controls for chemical screening tests are to be performed at the beginning of each day to demonstrate that the reagents used are not contaminated. In addition, spot plates used to perform chemical screening tests are to be visually examined by the analyst prior to use to ensure that they are free of debris or residue.

Limitations:

All color tests are presumptive in nature and serve only as a guide for the analyst's analytical scheme.

Adulterants and complex mixtures may produce reactions that interfere with the clear interpretation of the results.

A sample with a low concentration of a particular substance may yield negative color test results.

Advantages:

Color tests provide a quick and easy method of determining what type of compound or functional group a sample might contain.

Color tests can assist in the determination of appropriate analytical processing and the grouping of sample for uniformity testing.

Interpretation:

Any reaction observed by the analyst will be documented on the Drug Powder Sheet by writing the color observed.

With weak color changes, the analyst may choose to document the color preceded by the designation “weak.”

Reagent Preparation & Color Test:

Cobalt Thiocyanate Reagent

Dissolve 2.0g of cobalt thiocyanate in 100mL of deionized water. Mix the solution until completely dissolved.

Interpretation:

Formation of a blue color indicates the possible presence of cocaine hydrochloride

If addition of the cobalt thiocyanate results in no color formation or a weak blue color, then with the addition of 2.8N HCl a blue color develops. This indicates the possible presence of cocaine base.

Some other substances that form a blue color with the addition of the cobalt thiocyanate reagent are lidocaine, procaine, heroin, gamma-butyrolactone, ketamine, etc.

Marquis Reagent

Dilute 10mL of 37% formaldehyde solution in 90mL of concentrated sulfuric acid. While stirring, slowly add the concentrated sulfuric acid to the formaldehyde solution. Allow the solution to cool completely.

Interpretation:

Formation of an orange to brown color indicates the possible presence of amphetamine, methamphetamine, fentanyl or phentermine.

Formation of a purple color indicates the possible presence of heroin, other opiates, methocarbamol or guaifenesin.

Formation of a purple to black color indicates the possible presence of MDMA, MDE and MDA.

Formation of a green to black color indicates the possible presence of dextromethorphan.

Formation of a yellow color indicates the possible presence of diphenhydramine.

Formation of a red color indicates the possible presence of salicylates.

Froehde's Reagent

Dissolve 0.5g of sodium molybdate in 100mL of concentrated sulfuric acid. Mix the solution until completely dissolved.

Interpretation:

Formation of a purple color indicates the possible presence of heroin, and other opiates.

Formation of a green to black color indicates the possible presence of MDMA, and MDA.

Formation of a light blue color indicates the possible presence of acetaminophen.

Mecke's Reagent

Dissolve 1.0g of selenous acid in 100mL of concentrated sulfuric acid. Mix the solution until completely dissolved.

Interpretation:

Formation of a green color indicates the possible presence of heroin, and other opiates.

Formation of a blue-green to green color indicates the possible presence of MDMA, and MDA.

Dilly Koppannyi Reagent

Dilly

Dissolve 0.1g of cobaltous acetate tetrahydrate in 100mL of methanol. Then add 0.2mL of glacial acetic acid to the solution. Mix the solution until completely dissolved.

Isopropylamine

Dilute 5mL of isopropylamine in 100mL of methanol. Mix the solution completely.

Interpretation:

Formation of a purple color indicates the possible presence of barbiturates.

2.8N Hydrochloric Acid Reagent

Dilute 92.6mL of 12.1N hydrochloric acid in 400mL of deionized water. Mix the solution completely.

Cocaine/Codeine Standard (QC Mix)

Dissolve 10.0 mg of cocaine hydrochloride and 10.0mg of codeine phosphate and bring to volume with 10mL of methanol. Mix the solution until completely dissolved.

Microcrystalline Test

25% Hydrochloric Acid

Dilute 25mL of 12.1N hydrochloric acid in 50mL of deionized water in a 100mL graduated cylinder. Then bring the solution to a final volume of 100mL with deionized water. Mix the solution completely.

Gold Chloride

Place 5g of gold chloride trihydrate into a 100mL graduated cylinder. Dissolved and brought to 99mL volume with 25% hydrochloric acid. Add 1mL of glycerol to the 100mL graduated cylinder to bring final volume to 100mL.

Interpretation

Examine the sample under a polarized light microscope with either 4x or 10x magnification. Formation of X crystals indicates the presence of cocaine.

20% Acetic Acid Reagent

Dilute 100mL of glacial acetic acid in 400mL of deionized water. Mix the solution completely.

(+)-Di-p-tolouyl-D-tartaric Acid (TLTA)

Place 100.0mg of TLTA in a 100mL graduated cylinder. Brought to a 10mL volume with anhydrous alcohol. Then brought to a 99mL volume with deionized water. Added 1mL of glycerol to the graduated cylinder to bring final volume to 100mL.

Interpretation

Once cocaine presence is determined by the gold chloride test, the chemist will verify the presence of L isomer. Examine the sample under a polarized light microscope with either 4x or 10x magnification. The formation of a multitude of single needles, tufts, fan-shaped or sheaves crystals indicate the presence of L cocaine.

If addition of the TLTA results in no needle formation, then with the addition of dilute acetic acid the needles develops. This indicates the possible presence of cocaine base.